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Marine Life Protection Act Initiative

Habitat Evaluations of the Round 1 External Proposed MPA Arrays for the North Coast Study Region

Presentation to the MLPA Blue Ribbon Task Force
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Round 1 Evaluation Notes, Part 1

- Most external marine protected area (MPA) arrays proposed tribal uses in some MPAs, including otherwise “no-take” areas, but did not specify types of uses (i.e., gear, species)
- MLPA Master Plan Science Advisory Team (SAT) **did not have sufficient information in Round 1 to integrate tribal uses in evaluations** (i.e. proposed tribal uses were not considered in assigning levels of protection), **but this will likely change in Round 2**

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Round 1 Evaluation Notes, Part 2

- For the sake of consistency, **state marine conservations areas (SMCAs) in External MPA Array C** that proposed tribal uses only were **evaluated as state marine reserves (SMRs)**
- For evaluations, **mobile MPAs in External MPA Array A were treated as static**, and stewardship zones were not evaluated
- Recent additions and revisions to substrate data slightly changed the evaluation results; **this presentation includes revised results**

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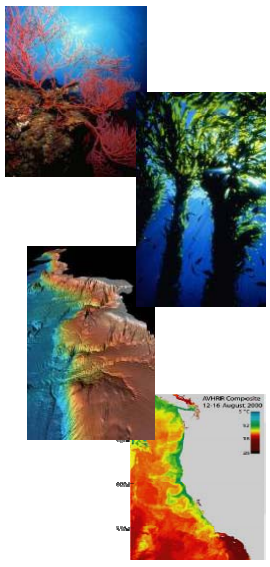
MLPA Goals*: Habitats

1. To protect the natural diversity and function of **marine ecosystems**.
2. To help sustain and restore **marine life populations**.
3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
4. To protect representative and unique **marine life habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. To ensure that MPAs are designed and managed as **a network**.



** Note that this language represents a summary of the MLPA goals*

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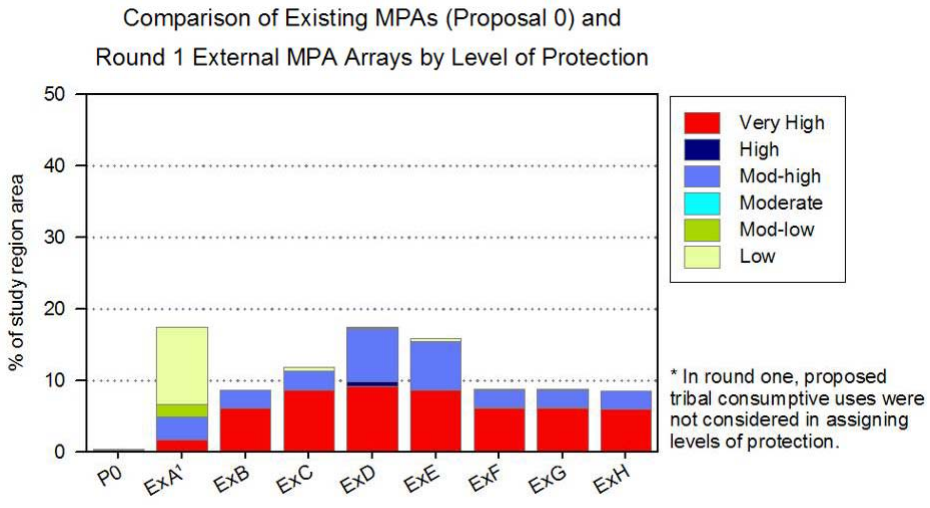
Round 1 Arrays by Level of Protection



**P0 = MPA Proposal 0* *ExA – ExH = external MPA arrays A through H*

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Habitat Protection Guidelines

- **Every 'key' marine habitat should be represented in the MPA network** to protect the diversity of species that live in different habitats and those that move among different habitats over their lifetime.
- **'Key' marine habitats should be replicated in multiple MPAs across large environmental and geographic gradients** to protect the greater diversity of species and communities that occur across such gradients, and to protect species from local year-to-year fluctuations in larval production and recruitment.
- **At least three to five replicate MPAs should be designed for each habitat type** within a **biogeographical region** to provide analytical power for management comparisons and to buffer against catastrophic loss of an MPA.

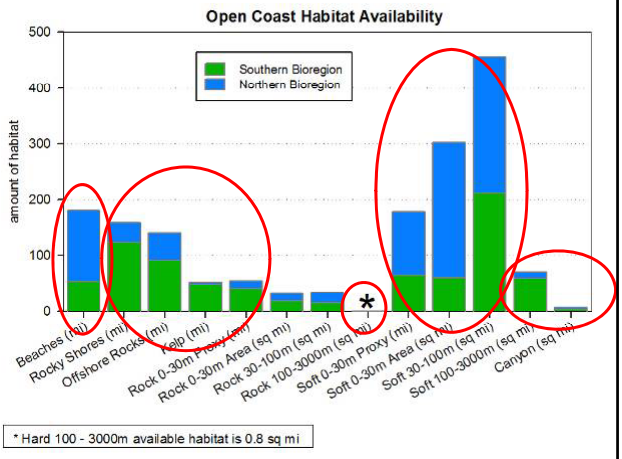
Evaluation: Habitats

Key Questions for Each Draft Array/Proposal

1. How well are key habitat types represented in draft MPA arrays?
2. What are the proposed levels of protection for these habitat types?
3. How well are habitats and levels of protection distributed across the study region?

Habitat Availability and Spacing

- Nearshore rocky habitats are less abundant in the northern bioregion
- >100 meter depth habitats are relatively rare across the region, occurring mostly in canyons and the southern bioregion
- Soft bottom habitats are especially abundant in the northern bioregion

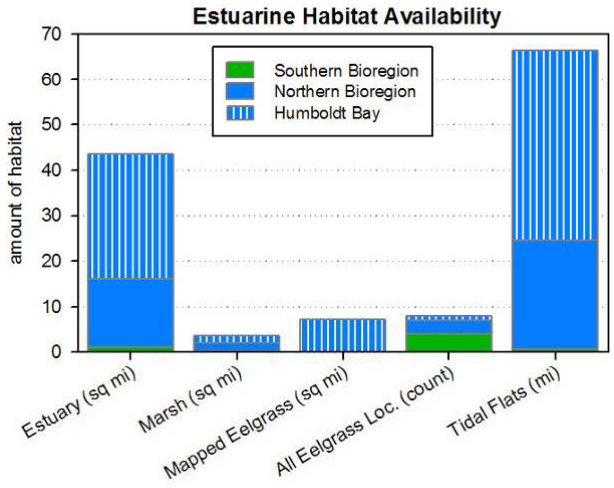


* Hard 100 - 3000m available habitat is 0.8 sq mi

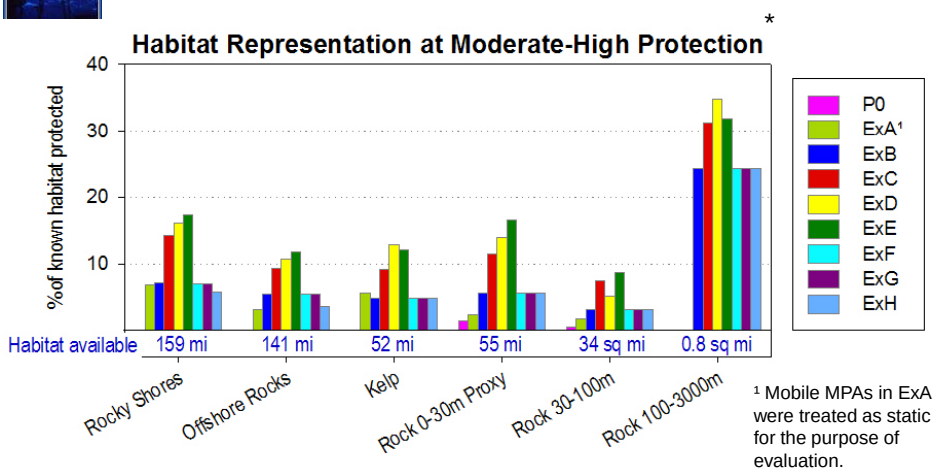
Note: some substrate mapping and 0-30 meter (m) proxy line were not available when external MPA arrays were developed

Results: Habitat Availability

- The northern bioregion contains the majority of estuarine habitats:
  98% of estuarine area
  96% of marsh area
  99% of tidal flats
- Humboldt Bay contains 62% of all estuarine area and 100% of mapped eelgrass in the MLPA North Coast Study Region (NCSR)
- Eelgrass is known to exist in 8 estuaries, 4 in the northern and 4 in the southern bioregions



Results: Habitat Representation

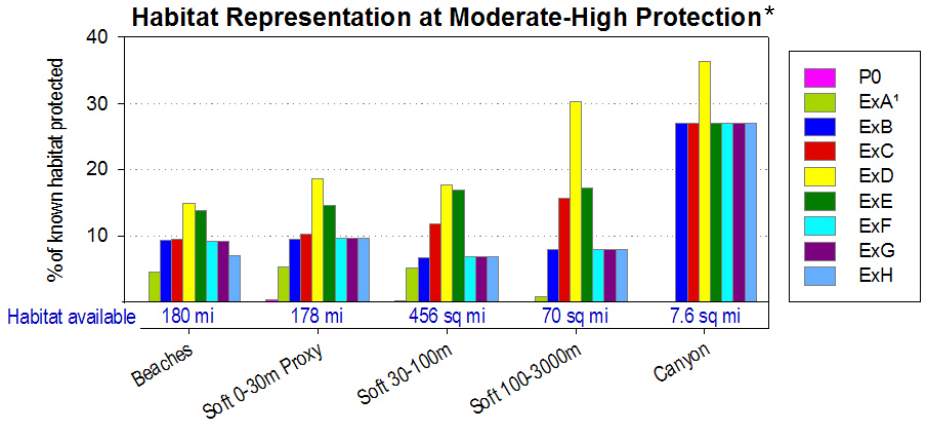


¹ Mobile MPAs in ExA were treated as static for the purpose of evaluation.

- **ExC, ExD and ExE include larger proportion of rocky habitats in MPAs as compared to other arrays**

** Evaluated for all MPAs at or above moderate-high protection*

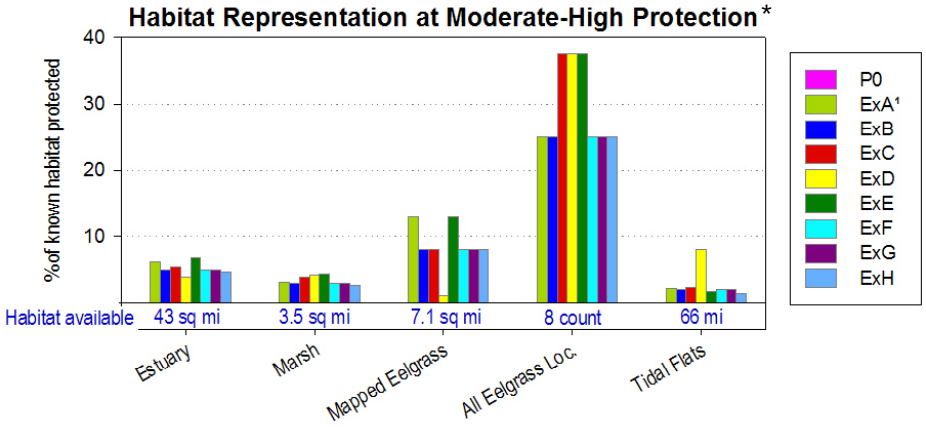
Results: Habitat Representation



- **ExC, ExD, and ExE generally include larger proportion of soft-bottom habitats in MPAs as compared to other arrays**
- **On average, arrays include larger proportion of soft-bottom habitats as compared to rocky habitats**

** Evaluated for all MPAs at or above moderate-high protection*

Results: Habitat Representation



- **All arrays include very high protection MPAs in south Humboldt Bay and Ten Mile River estuary**
- **All arrays except ExH include at least one additional estuary in southern bioregion above moderate-high protection (ExC and ExD include two)**

** Evaluated for all MPAs at or above moderate-high protection*

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Results: Habitat Representation

Summary

- In general, ExC, ExD and ExE include larger proportion of open coast habitats in MPAs at very high, high, and mod-high protection as compared to other arrays
- Similar configurations in ExB, ExF, ExG and ExH lead to similar habitat representation
- ExA includes large proportion of habitats in low protection MPAs
- Ranking of proposals by average representation at or above mod-high protection across all habitats:

  ExD **>** ExE **>** ExC **>** [ExB, ExF, & ExG] **>** ExH **>** ExA

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Methods: Habitat Replication

Guidelines for Replication

- 3-5 replicates of habitat per biogeographic region (i.e., from the California-Oregon border to Point Conception)
- SAT recommends at least 1 replicate of each habitat in each of the two north coast bioregions, if possible
- MPA or cluster must meet the minimum size guidelines (9 square miles).
- Habitat must meet the threshold identified to encompass 90% of biodiversity in that habitat type
- Estuarine MPAs do not have to meet size guidelines but must contain at least 0.12 square miles of estuarine habitat

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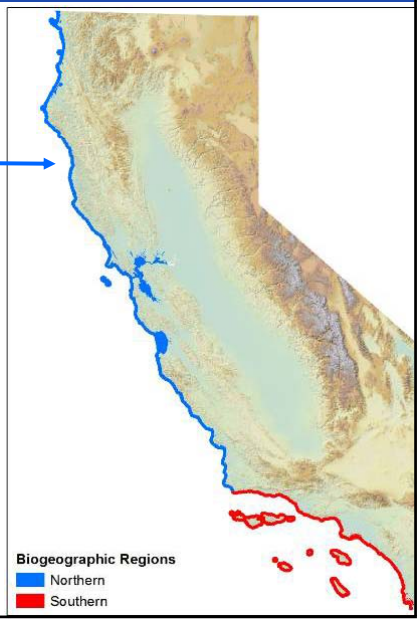
Replication Guidelines

- Replication guidelines in the *California Marine Life Protection Act Master Plan for Marine Protected Areas* call for 3-5 replicates within the MLPA **biogeographic region**



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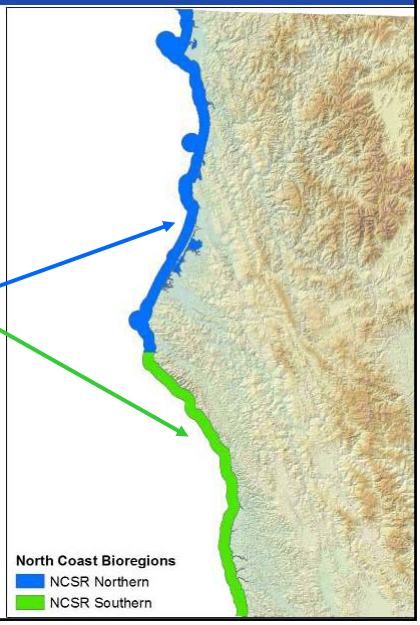
Replication Guidelines

- Replication guidelines in the *Master Plan* call for 3-5 replicates within the MLPA **biogeographic region**
- The SAT additionally recommends at least 1 replicate of each habitat per **bioregion**
- Two **bioregions** in the north coast study region



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Replication Guidelines

- Replication guidelines in the *Master Plan* call for 3-5 replicates within the **biogeographic region**
- The SAT additionally recommends at least 1 replicate of each habitat per **bioregion**
- Two **bioregions** in the north coast study region
- No strong biological break at Point Arena, thus the **southern bioregion of the NCSR extends into the northern half of the MLPA North Central Coast Study Region**

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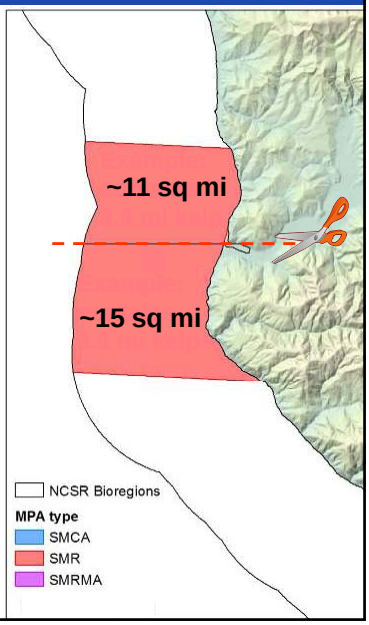
Habitat Replication and Bioregions

For an MPA that falls on the bioregional divide:

- If the MPA includes at least 9 square miles in each bioregion, the MPA **can be "split" into two at the bioregion boundary**.
- To count as 2 replicates, habitats must be **included in sufficient quantity** to count as a replicate **on BOTH sides of the bioregion divide**
- If a habitat is not included in sufficient quantity on **both** sides of the bioregion divide, **replication will be reduced by "splitting"**



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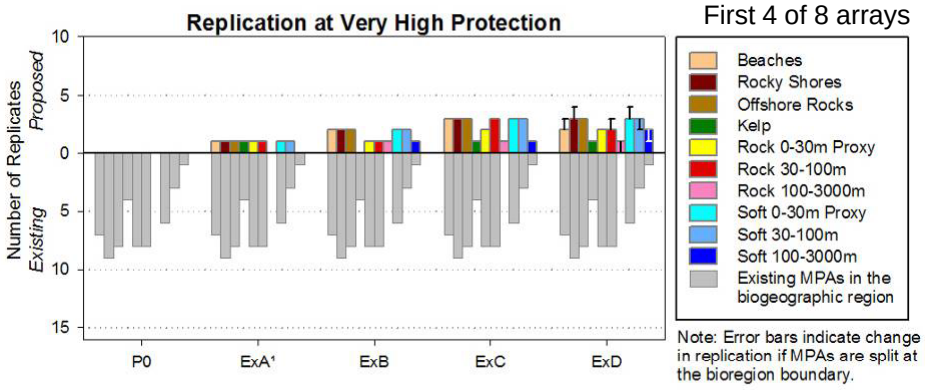
Replication: Very High Protection



- **For most habitats, 3-5 replicates already exist elsewhere in the biogeographic region (north central and central coast study regions)**
- **All arrays include 1-3 replicates of most habitats**
- **In ExD, splitting MPAs at the bioregion boundary would increase replication for some habitats and decrease replication for others**

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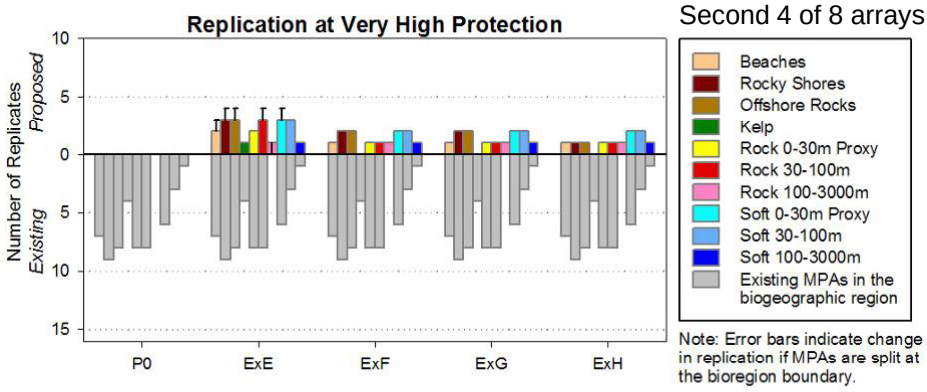
Replication: Very High Protection



- **For most habitats, 3-5 replicates already exist elsewhere in the biogeographic region (north central and central coast study regions)**
- **All arrays include 1-3 replicates of most habitats**
- **In ExE, splitting MPAs at the bioregion boundary would increase replication for some habitats and decrease replication for others**

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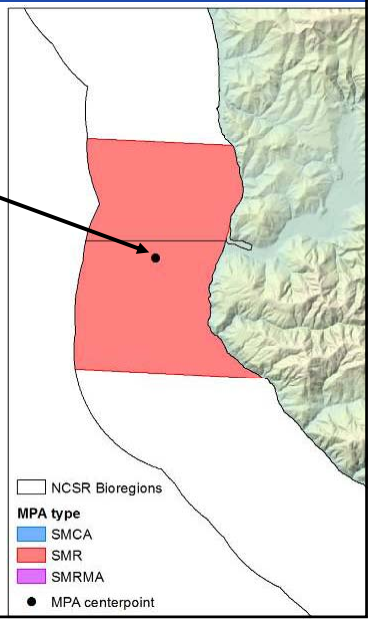
Habitat Replication and Bioregions

For an MPA that falls on the bioregional divide:

- In the original analyses the MPA **centerpoint** was used to determine which bioregion to assign habitat replicates.
- This somewhat arbitrary division of replicates led to artifacts in the bioregional replication analyses
- In revised analyses habitat replicates **are divided** across the two bioregions (1/2 replicate in each)



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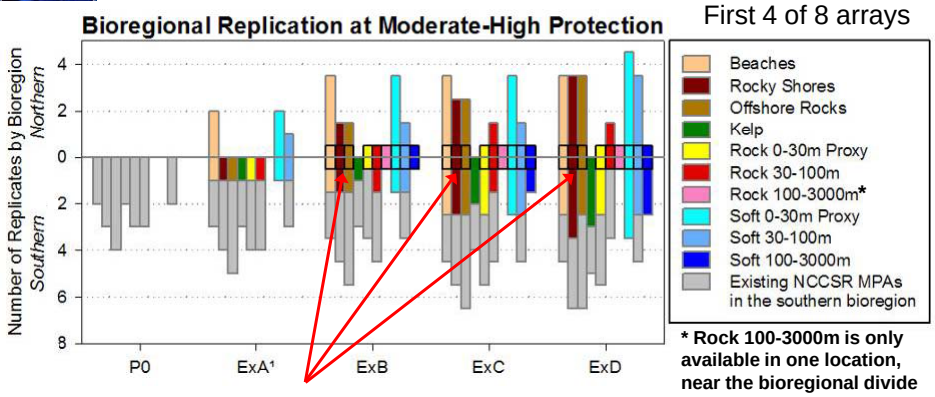
Bioregional Replication

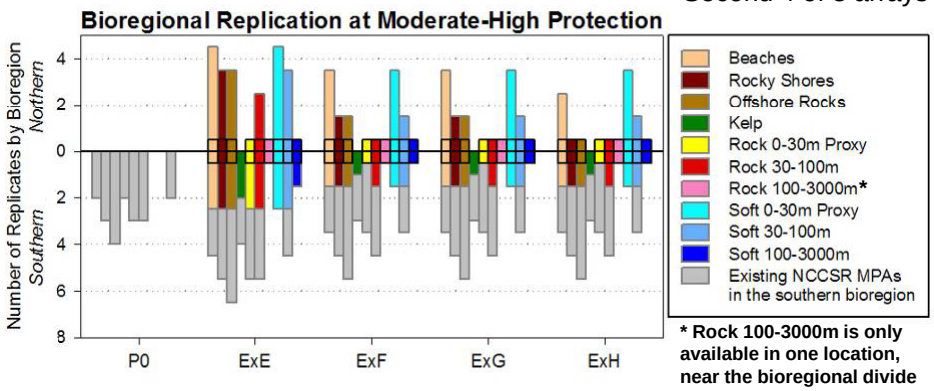


*** Rock 100-3000m is only available in one location, near the bioregional divide**

- Habitat replicates that fall on the bioregional divide are indicated with solid boxes and divided across the two bioregions in these figures
- None of the arrays replicate kelp in the northern bioregion or 0-30m rock or 100-3000m soft bottom north of the Punta Gorda area
- ExC and ExD generally include more habitat replicates than other arrays

Bioregional Replication

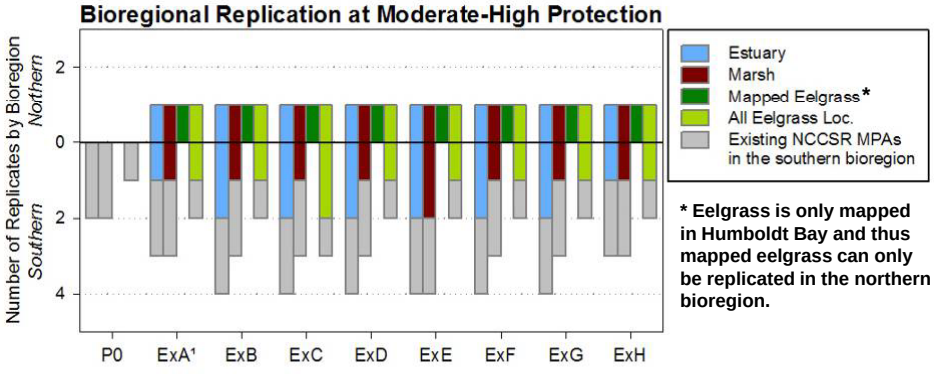
Second 4 of 8 arrays



*** Rock 100-3000m is only available in one location, near the bioregional divide**

- None of the arrays replicate kelp in the northern bioregion or 0-30m rock or 100-3000m soft bottom north of the Punta Gorda area
- ExE generally includes more habitat replicates than other arrays

Bioregional Replication



*** Eelgrass is only mapped in Humboldt Bay and thus mapped eelgrass can only be replicated in the northern bioregion.**

- All proposals include 2-3 replicates of estuary, and coastal marsh, and eelgrass locations
- All proposals include 1 replicate of mapped eelgrass in Humboldt Bay
- Estuarine habitat replication is distributed across both bioregions (where possible) for all arrays.

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Results: Habitat Replication

Summary

- All habitats already replicated in at least 3-5 MPAs at or above mod-high protection elsewhere in the biogeographic region (north central coast or central coast)
- On average, ExD, ExC and ExE provide largest number of replicates of open coast habitats at very high, high, and mod-high protection
- None of the arrays replicate kelp in both bioregions at or above mod-high
- All arrays replicate all estuarine habitats across both bioregions (where possible) at very high protection
- Ranking of arrays for replication across all habitats at mod-high protection:

  ExE > ExD **>** ExC **>** [ExB, ExF & ExG] **>** ExH **>** ExA

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Additions/Revisions to Substrate Data

- Since **original** Round 1 evaluations were conducted, several additions and revisions to substrate data in the study region affect results of SAT evaluations of Round 1 external MPA arrays
- High resolution substrate data added for area between False Cape and mouth of Humboldt Bay; substrate in area previously reported as unknown
- When processing earlier draft substrate data an error was made, causing shift in relative abundance of hard and soft bottom habitat, artificially increasing abundance of hard bottom habitat; error has been corrected

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Corrections to Round 1 Evaluations

- For some external MPA arrays, habitat representation slightly changed (no more than 2%) for hard and soft bottom habitats at 0-30 m, 30-100 m and 100-3000 m depth zones
- Replication of some habitats lost:
  - 30-100 m hard bottom in Point Cabrillo MPA cluster (ExD)
  - Splitting MPAs over the bioregion boundary no longer increases replication of 100-3000 m hard bottom for any proposal
- Replication of some habitats gained:
  - 0-30 m and 30-100 m soft bottom and 30-100 m hard bottom in False Cape SMCA (ExE)
  - 0-30 m soft bottom in Eureka Mobile SMCA (ExA)
  - 0-30 m soft bottom in Eel River SMCA (ExB, ExF, ExG, ExH)
- Changes in replication affected spacing of habitats for these arrays

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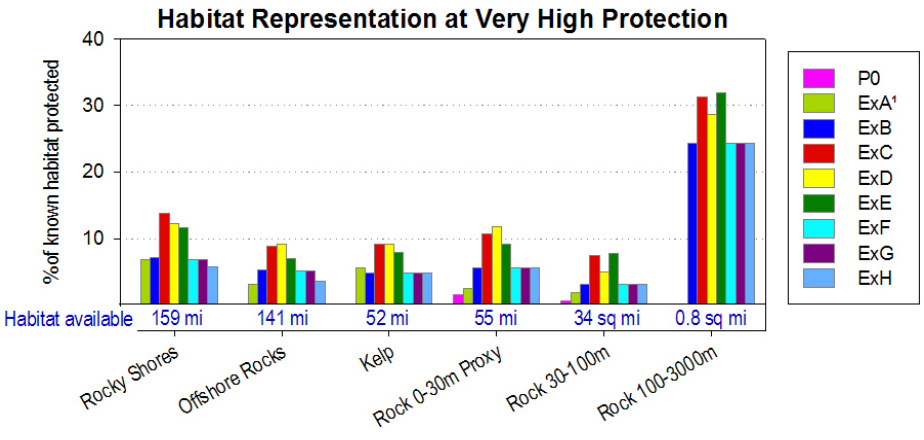
Supplementary Information



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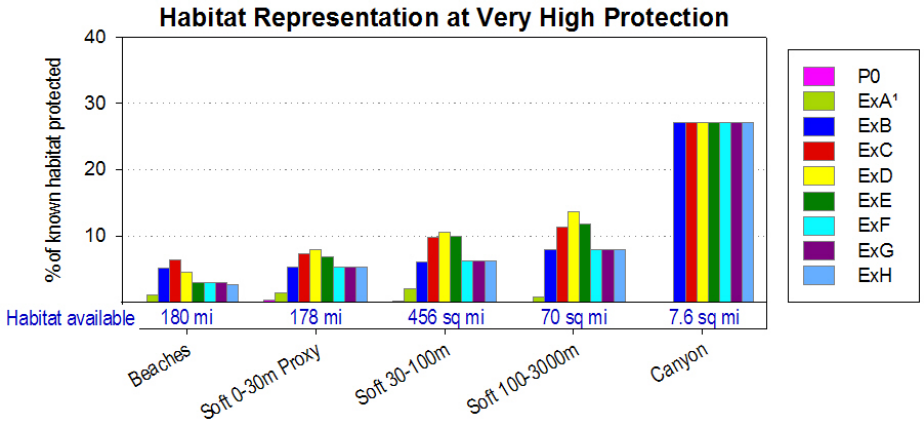
Supplementary Information



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Supplementary Information